The Role of Usability Testing in Web Site Design: The National Biological Information Infrastructure's Experience

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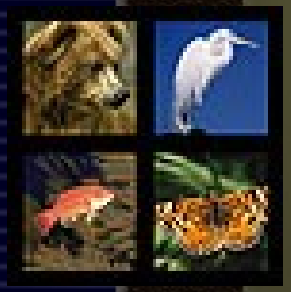
National Biological Information Infrastructure

What is the NBII ?



The NBII is an electronic gateway to biological data and information maintained by federal, state, and local government agencies; private sector organizations; and other partners around the nation and the world.

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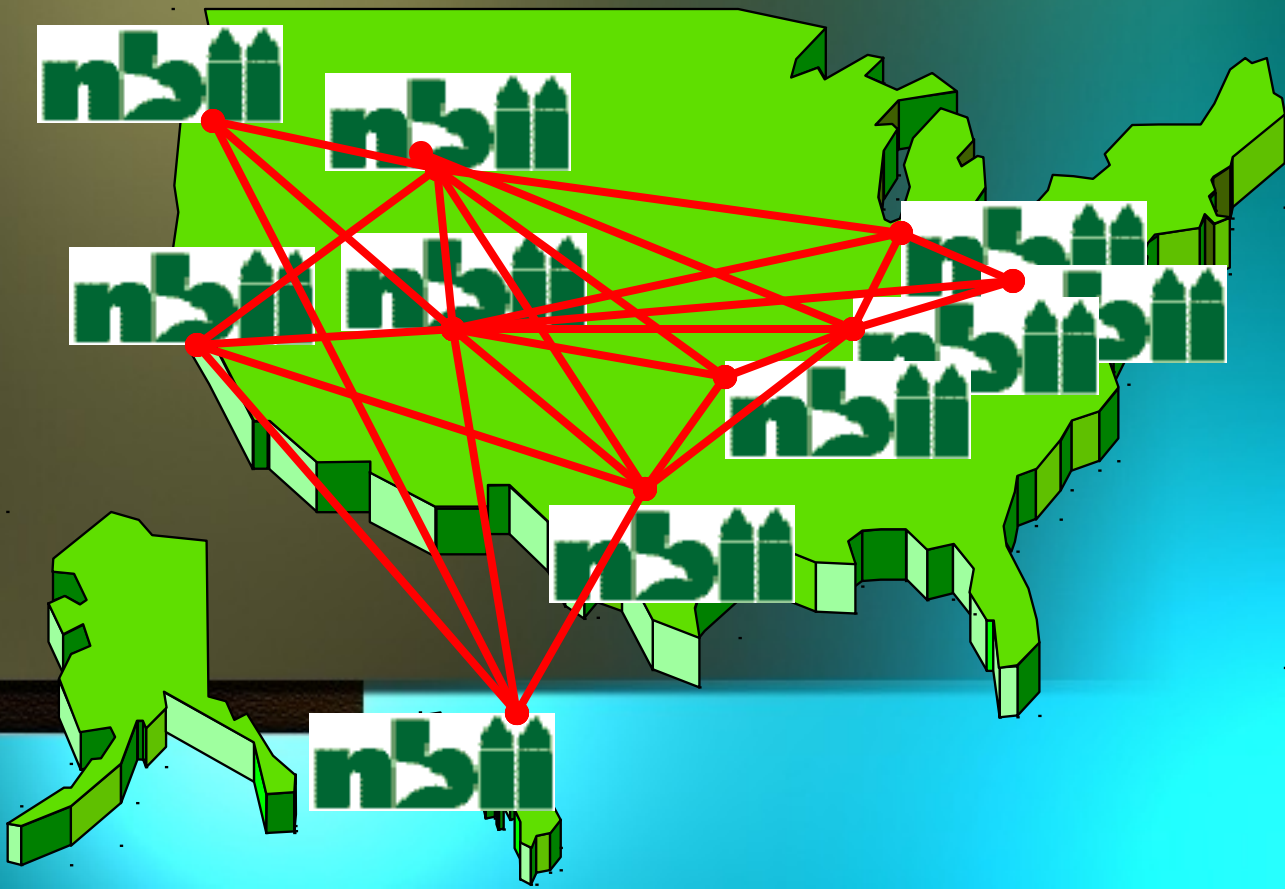
Challenges for Design of the NBII

NBII is a distributed network

Multiple developers + multiple formats = potential



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Challenges for Design of the NBI

- ✓ **Multiple audiences**
  - ✓ Like many other federal Web sites, the NBII's Web site has a wide variety of users with different information needs
    - ✓ Researchers
    - ✓ Natural resources managers
    - ✓ Policymakers
    - ✓ Educators
    - ✓ Students
    - ✓ Interested public citizens
- ✓ **Large amount of content**
  - ✓ Management and organization are ongoing issu

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What is Usability?

Usability

- ✓Site architecture
- ✓Site interface

"It is not how much space there is, but rather how it is used. It is not how much information there is, but rather how effectively it is organized." -Edward Tufte

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How Do You Measure It?

- ✓ **Heuristics**
  - -application of accepted standards
  - -Pros: widely available; inexpensive if self-ap
  - -Cons: more generalized
- ✓ **Testing**
  - -observing actual users
  - -Pros: concrete data; specific to your site
  - -Cons: can be expensive; investment of time
- ✓ **Combination**
  - -heuristics can correct obvious flaws
  - -follow-up testing can focus on specific tasks

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National Biological Information Infrastructure

Original NBII Homepage

Design of site doesn't reflect mission

Navigation not persistent; poor labeling

Major tools & content available only on homepage

Overlapping thematic areas

National Biological Information Infrastructure
The NBII: Building Knowledge Through Partnerships
Click here for information on NBII partnership opportunities
About NBII
What's New
Tools
Standards
User Survey
Postcards
Contact Us
Phone: (703) 648-4205
Fax: (703) 648-4224
E-mail: nbii@nbii.gov
The NBII is an electronic gateway to bio
and information maintained by federal, s
local government agencies; private secto
organizations; and other partners around
and the world.
Search the NBII Web
Search NBII Web pages
Search NBII Metadata Clearinghouse
Search a catalog of biological information
Hot Topics
What's hot and upcoming in biological resource information.
Education
Biological information of interest to teachers, students, and others.
Invasive Species
Information relating to non-native plant and animal species present in U.S. ecosystems.
Biodiversity, Systematics, and Collections
Information on descriptions, classification, and scientific collections of biological diversity.
United States
State and national biological information.
International
Biological information sites in other countries.
Programs and Organizations
Biological information from other programs and organizations.
Amphibians
Focus on amphibian declines and deformities.
Pollinators
Coming soon..
Done
Internet zone

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Initial Redesign

- ✓ **Complete "renovation" of site Jan-Jun 2000**
  - ✓ New "look and feel" to better reflect mission
  - ✓ New interface features to provide feedback
  - ✓ New architecture to accommodate major content expansion and inadequate structure
- ✓ **Five-month project**
  - ✓ Core team of five members part-time
- ✓ **Accomplished through heuristic analysis**
  - ✓ Redesign Team had usability experience
  - ✓ Former site was completely reworked and expanded
  - ✓ Usability testing would not have been beneficial at this point; would have focused on things already identified as problematic

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Homepage after first redesign

- ✓ Launched July 2000
- ✓ New interface
- ✓ Revamped architecture
  - Graphics convey mission of site
  - Persistent navigation
  - User feedback for constant positioning
  - Fresh content updates to homepage

National Biological Information Infrastructure
We Welcome You to Join and our Partners
NBII Home
Biology in the Uses
Current Biological Issues
Biological Disciplines
Geographic Perspectives
Education
Data & Information Products
Search
Contact Us
Partners
Program News
Presentations
Publications
NBII: The Nation's Biological Information System
The National Biological Information Infrastructure (NBII) <http://www.nbii.gov> is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.
NBII Science Features
ABI's NatureServe Debuts
The Association for Biodiversity Information (ABI), a key NBII partner, announces the debut of NatureServe, an "online encyclopedia of life." NatureServe provides authoritative conservation information in a searchable database for more than 50,000 plants, animals, and ecological communities of the United States and Canada. Species data include endangered status, distribution, life history, and references.
9 Hierarchical Menu Trees Created

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Why Test After Initial Redesign?

- ✓How successfully does the site enable users of various backgrounds, and with different information needs, to find answers to their questions about natural resources?

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Setting Up the Study

- ✓ **Facility**
  - Bureau of Labor Statistics' Usability Lab
  - Reserved 2 months in advance
  - Lab use free to federal agencies
- ✓ **Initial design of test**
  - Formulating questions: specific functionalities to test
- ✓ **Consultation & Hiring of Usability Specia**
  - Professional review of our testing procedur
  - Impartial, third-party facilitator to administ
  - Authoritative review of findings

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Setting Up the Study, cont'd.

- ✓ **Recruited participants**
  - Did this ourselves to save money
  - Needed to recruit from various user constituencies
  - Methods included: contacting DOI colleagues; posting to listservs; posting notices in local universities; posting on the Web site
  - Time-intensive: sorting of responses, phone interviews, scheduling took about a week - 3 people over 2 days to record observations on checklist, operate video-recording equipment, summarize results
- ✓ **NBII Personnel Involved**

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The Test

- ✓14 participants recruited; 12 showed up for test
- ✓Each session lasted 45-50 minutes
- ✓Participants signed consent to be videotaped
- ✓Stressed that study was testing the site, not the user or his/her skills
- ✓Participants encouraged to “think out loud,” articulate thought and action processes

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The Test, cont'd.

- 22 questions:
  - 1-6 were "mouse-less"; asked for impressions about the homepage
    - Where do your eyes focus at first glance?
    - What looks clickable?
    - What's the goal of this site?
    - Do you sense an organization or structure?
    - Does the terminology you see make sense?
    - Is there balance or clutter?

The Test, cont'd.

- 22 questions, cont'd:
  - Questions 7-22 were task-based:
    - Locating recent news about a topic
    - Getting local information
    - Finding scientific resources
    - Searching for specific information
    - Locating educational resources
    - Getting information about site & sponsor
  - Few minutes left at the end for general comments about the site

Summary of data

Tasks common to general Web use (find news, perform search, identify source) were easily accomplished.

7 news	12/12	100%
8 local	6/12	50%
9 name	4/12	33%
10 geo	6/12	50%
11 meta	4/8	50%
12 int'l	10/12	83%
13 search	9/11	82%
14 topic	9/10	90%
15 law	3/9	33%
16 child	2/8	25%
17 tourist	6/9	66%
18 card	9/10	90%
19 scope	7/10	70%
20 sponsor	7/10	70%
21 partner	10/10	100%
22 contact	10/10	100%

Analytical tasks (interpretation of terminology, selection of "best source") were more difficult.

So What Does It Mean?

- ✓ **The Good**
  - ✓ Users were able to locate information on timely and general topics.
  - ✓ Users liked the design of the site, and found it attractive and uncluttered.
  - ✓ In general, major thematic groupings held up.
  - ✓ They liked the “idea” of the site – a one-stop resource for biological data and information.
  - ✓ Users liked annotations to indexed resources, which provided context.

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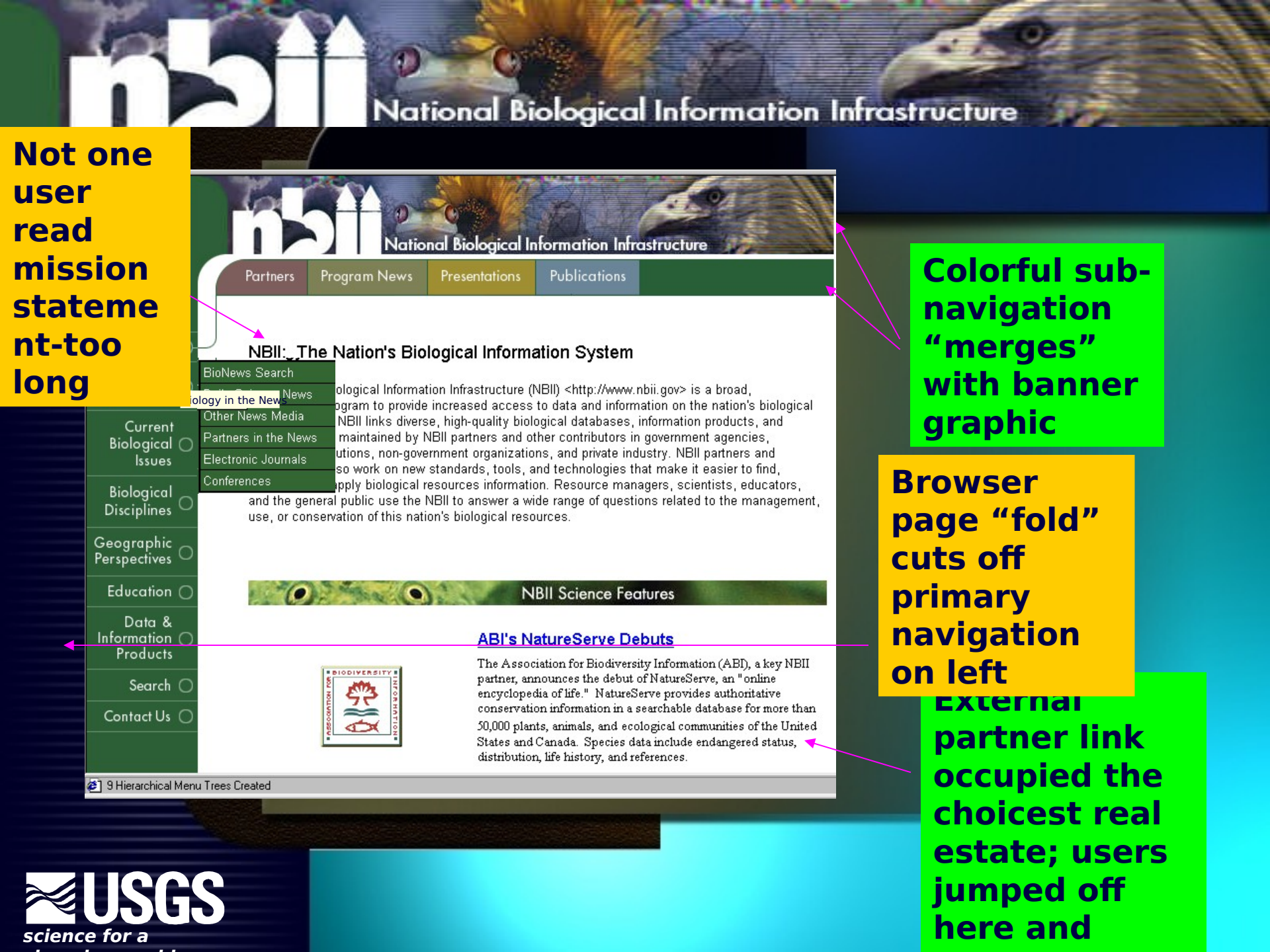
So What Does It Mean?

- The Bad
  - Sub-navigation unnoticed by users who didn't differentiate it from the banner – colors blended.
  - Browser "alt tags" rendered over navigational rollovers irritated users.
  - Right-side, internal navigation for various thematic areas bothered users.
  - Too many pages had excessive scrolling.
  - Some areas had too many lists, without the context to aid in resource selection.
  - Eyes tracked to center of homepage, where links to partners took them off site immediately; not readily apparent what was linked resource vs. our content.


National Biological Information Infrastructure
Not one user read mission statement-too long
National Biological Information Infrastructure
Partners
Program News
Presentations
Publications
NBII: The Nation's Biological Information System
BioNews Search
News
Other News Media
Partners in the News
Electronic Journals
Conferences
Current Biological Issues
Biological Disciplines
Geographic Perspectives
Education
Data & Information Products
Search
Contact Us
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9 Hierarchical Menu Trees Created
Colorful sub-navigation "merges" with banner graphic
Browser page "fold" cuts off primary navigation on left
External partner link occupied the choicest real estate; users jumped off here and
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What Does It Mean?

- The Ugly
  - Labeling/naming of categories not intuitive for many users
    - Education=resources for beginners, teacher resources, or higher-education opportunities?
    - Current Biological Issues=Biology in the News for many
  - Search had many problems
    - Too many search tools (four)
    - Use of outside search agent brought in unrelated & unreliable results
    - Search-oriented users were easily frustrated
  - Text-heavy areas were ignored or poorly digested

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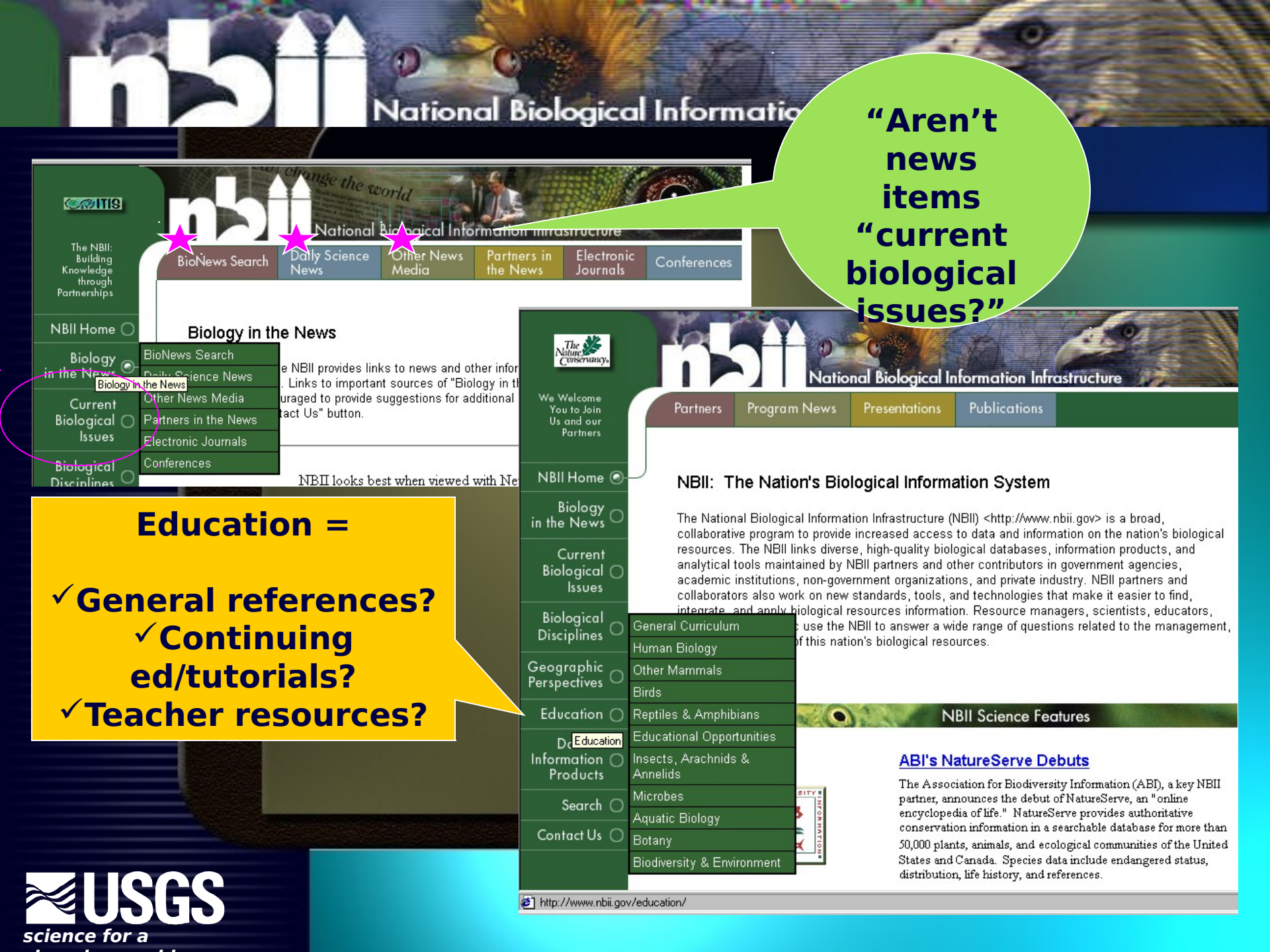
National Biological Information
"Aren't news items "current biological issues?"
ITIS
The NBII: Building Knowledge through Partnerships
NBII Home
Biology in the News
Current Biological Issues
Biological Disciplines
BioNews Search
Daily Science News
Other News Media
Partners in the News
Electronic Journals
Conferences
Biology in the News
NBII looks best when viewed with Ne
The Nature Conservancy
We Welcome You to Join Us and our Partners
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use the NBII to answer a wide range of questions related to the management,
of this nation's biological resources.
Geographic Perspectives
Education
Information Products
Search
Contact Us
General Curriculum
Human Biology
Other Mammals
Birds
Reptiles & Amphibians
Educational Opportunities
Insects, Arachnids & Annelids
Microbes
Aquatic Biology
Botany
Biodiversity & Environment
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http://www.nbii.gov/education/
Education =
✓General references?
✓Continuing ed/tutorials?
✓Teacher resources?
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Implementation

- ✓ **Interface**
  - ✓ Monochromatic sub-navigation (navigation, not desi
  - ✓ Site-wide navigation, key content "above the fold"

- ✓ **Naming conventions**
  - ✓ Consolidate "similar-sounding" categories
  - ✓ Clarify vague terms
    - ✓ Education → Teacher Resources
    - ✓ Biology in the News → a sub-category of Current Biological Issues
    - ✓ Systematics → Systematics / Scientific Names (jargon issues)

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Links | Windows | Windows Update | Channel Guide | Quick Search | Toggle Images | RealPlayer

Google | Search Web | Address http://www.nbii.gov/

National Biological Information Infras

NBII Home

- About NBII
- Current Biological Issues
- Biological Disciplines
- Geographic Perspectives
- Teacher Resources
- Data & Information Resources
- Search
- Contact Us

8 Hierarchical Menu

The NBII: Your Home for Biological Information on t

- Learn about upcoming conferences of interest to the natural resources, bioinformatics, and life sciences communities.
- FrogWeb has a new look.
- Read the latest issue of the NBII newsletter, Access.
- Want to view specimens and exhibits from museums around the world without leaving home? Check out our index of Museums and Collections.
- Looking for biological information on the Web? Try BioBot, the NBII's biological search engine.
- Send an NBII Postcard to a friend.

Partners in the Spotlight

The Ecological Society of America and the NBII announce the launch of the Ecological Information Network (EIN), a publicly accessible database of ecological experts who are available to answer queries on a range of scientific issues.

The United States has signed an official Memorandum of Understanding to participate in the Global Biodiversity Information Facility (GBIF). The NBII will be an active participant in this initiative.

Headline clearly defines, reinforces purpose of site in one sentence.

Partners highlighted prominently, but not centrally.

Persistent navigation is "above-the-fold." One category deleted, one added.

Internal features highlighted, hot-linked, in key eye-space of page. Highlights

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National Biological Information Infrastructure

National Biological Information Infrastructure
Invasive Species
Amphibians
Biodiversity
Pollinators
The NBII: Building Knowledge through Partnerships
NBII Home
Biology in the News
Current Biological Issues
Biological Disciplines
Geographic Perspectives
Education
Data & Information Products
Search
Contact Us
West Nile Virus
On October 5th, the Centers for Disease Control and Prevention (CDC) announced that the West Nile virus, and not the St. Louis encephalitis virus, is responsible for the outbreak of encephalitis in the New York City area. The virus has been blamed for six deaths, and has sickened at least thirty people. The West Nile virus originates in Africa, and rarely occurs outside of Africa, Australia, and the Middle East. Like the St. Louis virus, the West Nile virus identified in New York is an arbovirus, spread by the bite of infected mosquitoes. According to CDC officials, the virus is not directly transmitted between humans.
Jack Jeffrey
A critical factor in the identification of the West Nile virus in NYC was the discovery of a multitude of dead birds at the Bronx Zoo; these deaths coincided with the deaths of dozens of crows near the Zoo.
The primary transmitter of the West Nile virus in the U.S. outbreak is the female Culex pipiens mosquito, which acquires the virus when it bites an infected bird for the blood meal needed to produce mosquito eggs. If the same mosquito subsequently bites a human, it can pass the virus to a human host. The Culex pipiens mosquito is also a primary transmitter of St. Louis encephalitis.
CDC researchers reversed the original diagnosis of the St. Louis virus as the cause of the New York cases after learning from pathologists at the Bronx Zoo that more than 20 flamingoes, herons, and bald eagles had died of an
9 Hierarchical Menu Trees Created

First redesign: one page, five screens long; three screens of text and bulleted list of 40+ links.

Note that sub-navigation buttons changed to flat green to convey "navigation"

National Biological Information Infrastr
NBII Home
About NBII
Current Biological Issues
Biological Disciplines
Geographic Perspectives
Teacher Resources
Data & Information Resources
Search
Contact Us
Invasive Species
FrogWeb: Amphibian Declines & Deformities
Biodiversity
Pollinator Declines
West Nile Virus
Biology in the News
West Nile Virus
After a winter of dormancy, mosquitoes infected with the West Nile Virus re-emerged in the Spring of 2000, bringing with them a second year of dead birds, human illness, and public concern. Confined largely to the northeastern states in 1999, the virus was detected in dead birds found throughout the mid-Atlantic and upper southeast in 2000. Fall bird migrations and over-wintering mosquito populations would appear to favor the continuing spread of West Nile Virus to the mid-Atlantic and southern U.S. during colder months, as well as an ongoing presence in the northeast.
Jack Jeffrey
Latest News
Human Health & the WNV
Wildlife & the WNV
State & Regional Information
Frequently Asked Questions
The New York Academy of Sciences will host the

New site: one and a half screens; content sub-categorized; one paragraph summary.

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Implementation, cont'd

- ✓ **Consolidation of search functions**
  - ✓ Four "search tools" cut down to two, with no loss of search capabilities
- ✓ **Bullets, highlights, focus points for intro areas; text-intensive area**
  - ✓ Top-level pages contain easily scanned main points; paragraphs limited to one main concept; key terms hotlinked
  - ✓ Detail moved to inner pages

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In Conclusion

- ✓Usability testing can uncover both interface problems and deeper, structural flaws.
- ✓Prioritize findings, and plan implementation
- ✓Accept that users' experiences of your site will never be exactly the same, and that the perfect Web site does not exist.
- ✓By their nature, Web sites grow and change; thus, usability is a ongoing process, not a one-time concern.

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Resources Used by NBII

- ✓ **Consultant for the NBII's Usability Stu**
  Human Factors International http://www.h

- ✓ **Facility for Testing**
  Bureau of Labor Statistics Usability Lab
  - available free to federal agencies
  - use of room and equipment only
  - users bring supplies and personne
  - BLS does not provide consulting
  - BLS does not recruit participants
  - contact John Bosley 202.691.7514

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Print Resources

Good Starting Points

- The Web Usability Handbook – Mark Pearrow
- Don't Make Me Think! – Steve Krug
- Designing Web Usability – Jakob Nielsen
- Information Architecture for the WWW – Lou Rosen

Advanced Topics

- Contextual Design – Byer & Holtzblatt
- User & Task Analysis for Interface Design – Hockes et al
- Anything by Edward Tufte, Richard Saul Wurzman, and Donald Norman

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Web Resources

Web Sites

- ✓Alertbox / Useit.com (www.useit.com)
- ✓Usability.gov (usability.gov)
- ✓Usable Web (usableweb.com)
- ✓User Interface Engineering (world.std.com/~uieweb
- ✓Human Factors International (www.hci.com)

Listservs

- ✓ASIST&T's Information Architecture SIG (www.asis
- ✓ ACM's SIG-CHI (www.acm.org)

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